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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,010	01/23/2002	Toru Tanikawa	23700.00110	1307

7590 11/16/2005

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EXAMINER

TUGBANG, ANTHONY D

ART UNIT	PAPER NUMBER
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3729

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/994,010

Applicant(s)

TANIKAWA ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-10, 12, 13 and 15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-10, 12, 13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/423,793.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on August 24, 2005 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.
4. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 12, the phrase of "instead of piezoelectric materials" (lines 4-5) raises a great deal of confusion as to whether the materials of the second sheet are piezoelectric or not. For example in Claim 8, the phrase of "second sheet formed of pliant piezoelectric materials (lines 6-7 of Claim 8) requires that the second sheet be formed of piezoelectric materials, yet the phrase of "instead of piezoelectric materials" (lines 4-5 of Claim 12) completely contradicts this. So is the second sheet formed of piezoelectric materials or not?

Claim Rejections - 35 USC § 102

5. Claims 8-10, 12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Okawa et al 5,639,508.

Okawa discloses a method of manufacturing a piezoelectric actuator comprising: forming a first sheet (bottom layer 40 in Fig. 4) formed of piezoelectric ceramic pliant materials and a second sheet (top layer 40) formed of pliant piezoelectric ceramic materials; forming an upper electrode layer (top electrode layer 42 in Fig. 4) on one surface of the first sheet; forming a lower electrode layer (either one of bottom electrode layer 40 or layer 44) on the other surface or opposite surface of the first sheet, wherein an electrode layer for polarization formed of conduction material is formed on the other surface of the second sheet; piling and densifying or drying the first and second sheets having the lower electrode layer between (see col. 5, lines 8+); polarizing the first sheet in a thickness direction of the first sheet (see col. 5, lines 65+); patterning the upper electrode layer 42 in order to form multiple electrodes corresponding respectively to each of the pressure chamber (32a, 32b, 32c) of the pressure chamber forming unit, which meets all of the limitations of the claimed invention.

With respect to the first and fourth processes (detailed recitations at lines 11-13 and lines 18-20 of Claim 8), Okawa further teaches that the electrode layer (middle layer 40 or layer 54) is utilized for polarization of the conductive material on the surface sides of the second sheet and a voltage is placed across a face surface of the upper electrode layer 42 and a face surface of the electrode layer (either 40 or 54) for polarization where at least the first sheet is polarized in the direction of a thickness of the first sheet (see col. 6, lines 3+).

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Regarding Claim(s) 9, within the second process, Okawa further teaches a pliant third sheet (middle layer 40) in which openings 52 are provided and the third sheet is piled on one surface side of the first sheet and is densified or dried with the first and second sheets.

Regarding Claim(s) 10, within the fourth process, Okawa further teaches that one surface side of the first sheet is conducted with the patterning of the upper electrode layer so that the first sheet will be separated by openings 52 corresponding respectively to each of the pressure chambers 32a, 32b, 32c.

Claim Rejections - 35 USC § 103

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okawa et al.

Okawa, as relied upon above in Claim 12, teaches the claimed manufacturing method further including that on the other surface side of the lower electrode layer is a vibrator 35 that generates the pressure for ejecting the ink in the pressure chamber during operation. Okawa does not appear to teach that the lower electrode layer is formed thicker than the upper electrode layer.

The dimension of relative thickness between the lower electrode layer and the upper electrode layer is considered to be an effective variable within the level of ordinary skill in the art in manufacturing electrode layers of piezoelectric actuators.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Okawa with a dimensional thickness of the lower electrode layer being greater or thicker than the dimensional thickness of the upper electrode layer, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). Furthermore, the

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relative thickness claimed between the upper and lower electrode layers do not provide any manipulative difference within the manufacturing steps when compared with the prior art method of Okawa.

Response to Arguments

7. The applicant(s) arguments filed on August 24, 2005 have been fully considered and are now considered to be met and inclusive in view of the rejection set forth above. The examiner notes that the limitations of “across a face surface....said electrode layer” (lines 21-23 of Claim 10 with similar limitations in Claim 15) are very broad limitations in that any face surface of either the upper electrode layer or the electrode layer can be read to meet the above limitations as the voltage applied by Okawa for polarization are placed along or across any of the face surfaces of the upper electrode layer and the electrode layer. For example, Okawa discusses at least one example of applying the voltage across electrodes 53, 54a, 54b, 54c (at col. 6, lines 5+) and since these electrodes actually carry the voltage and are in direct contact with the electrodes 40, 42 (see Fig. 5), then a voltage would be placed across any of the face surfaces of electrodes 40, 42, 53 and 54.

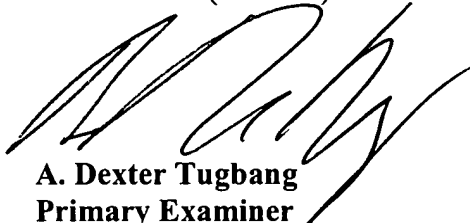
Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:00 am - 4:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang
Primary Examiner
Art Unit 3729

November 10, 2005